

Serial No.: 10/070,203

IN THE DRAWINGS:

The attached sheet of drawings includes changes to Figure 2. The sheet including Figures 1 and 2 replaces the original sheet including Figures 1 and 2.

REMARKS

I. Status Summary

Claims 1-25 are pending in the present application. Claims 1, 2, 4, 8, 11-13, 17-19, 22, and 24 have been amended. Claims 14-16, 20, 21, 23, and 25 have been canceled. Therefore, upon entry of this Amendment, Claims 1-13, 17-19, 22, and 24 will remain pending. No new matter has been introduced by the present Amendment. Reconsideration of the application as amended and based on the arguments set forth hereinbelow is respectfully requested.

Support for the amendments to the claims can be found throughout the present application. For example, the amendments to Claims 1 and 17 can be found at page 1, lines 6-8, page 14, lines 15-22, and page 16, line 28, to page 17, line 8, of the present application. The amendments to Claim 2 can be found, for example, at page 17, lines 5-8, of the present application.

II. Claim Rejections Under 35 U.S.C. § 102

Claims 1, 2, 4-7, 9, 10, 15, and 17 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,666,299 to Adams et al. (hereinafter, "Adams"). Further, Claims 1, 2, 5, 7, 9, 10, 15, and 17 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,487,573 to Jiang et al. (hereinafter, "Jiang"). These rejections are respectfully traversed.

II.A. Rejections Based on Adams

Claim 1 recites an interpolation filter for sampling frequency conversion of a digital input signal. An example of an interpolation filter **5** is shown in Figures 1 and 2, of the present application. Exemplary interpolation filter **5** is provided for a sampling frequency conversion of a digital input signal generated by an analogue-digital converter **2**. Further, Claim 1 has been amended to recite a filter coefficient generator for generating various sets of filter coefficients as a function of a base function (BF), wherein the base function (BF) is generated on the basis of a time-limited power sine

function $h_1(t)$. For example, interpolation filter **5** includes a filter coefficient generator **15**. Further, for example, filter coefficient generator **15** as shown in Figure 2 generates various sets of filter coefficients as a function of a base function BF, wherein the base function BF is generated on the basis of a time-limited power sine function $h_1(t)$.

Further, Claim 1 has been amended to recite that each of the various sets of filter coefficients has in a useful signal frequency band Δf_{nutz} of the digital input signal as an essentially equal amplitude response and different group delays τ . The filter coefficient generator selects that filter coefficient set whose group delay τ has a minimal deviation from a set desired group delay. Further, Claim 1 has been amended to recite a multiplier for multiplying the digital input signal by the filter coefficients of the selected filter coefficient set. For example, interpolation filter **5** includes a multiplier **13** for multiplying the digital signal by the filter coefficients of the selected filter coefficient set.

Claim 1 has also been amended to recite an accumulator for accumulating the digital input signal weighted by the multiplication with the filter coefficients of the selected filter coefficient set. For example, interpolation filter **5** includes an accumulator **23** for accumulating the digital input signal weighted by the multiplication with the filter coefficients of the selected filter coefficient set.

Figures 4a and 4b, of the presentation application, show an exemplary amplitude response and an associated characteristic of a group delay τ of the base function BF. (See page 14, line 24, to page 15, line 25, of the present application). Each of the various sets of filter coefficients generated by coefficient generator **15** has, in a useful signal frequency band Δf_{nutz} of the digital signal, an essentially equal amplitude response and different group delays τ . (See Figures 4a and 4b, of the present application). Filter coefficient generator **15** selects the filter coefficient set whose group delay τ has a minimal deviation from a set desired group delay τ_{SOLL} . (See page 15, lines 16-25, of the present application).

Adams discloses an asynchronous digital sample rate converter. The converter includes a digital interpolation filter **60**. (See Figure 3, of Adams). Interpolation filter **60**

comprises a zero-stuff circuit **68** and a low-pass filter **70**. Applicant notes that the interpolation filter recited by amended Claim 1 does not comprise a unit for zero-stuffing. Further, in comparing Adams' Figure 3 and the elements of Claim 1, applicant respectfully submits that it is apparent that Adams does not disclose or suggest a filter coefficient generator as recited by Claim 1.

Further, Adams does not disclose a base function that is generated on the basis of time-limited power sine function, as recited by Claim 1. Adams also does not disclose generating various sets of filter coefficients that each has in a useful signal frequency band Δf_{nutz} of the digital input signal as an essentially equal amplitude response and different group delays τ , as required by Claim 1. Additionally, Adams does not disclose a filter coefficient generator that selects filter coefficient sets whose group delay τ has a minimal deviation from a set desired group delay, as recited by Claim 1.

In addition, applicant respectfully submits that Adams also fails to disclose the element (b) feature of Claim 1 of a multiplier for multiplying the digital input signal by the filter coefficients of the selected filter coefficient set.

Lastly, applicant respectfully submits that Adams fails to disclose the element (c) feature of Claim 1 of an accumulator for accumulating the digital input signal weighted by the multiplication with the filter coefficients of the selected filter coefficient set.

In view of the foregoing, applicant respectfully submits that Adams fails to disclose each and every feature recited by Claim 1. Accordingly, applicant respectfully submits that the rejection of Claim 1 under 35 U.S.C. § 102(b) should be withdrawn and the claim allowed at this time.

Claims 2, 4-7, 9, and 10 depend upon Claim 1. Therefore, Claims 2, 4-7, 9, and 10 include the features recited by Claim 1. Accordingly, for the reasons provided for Claim 1, applicant respectfully submits that the rejection of Claims 2, 4-7, 9, and 10 under 35 U.S.C. § 102(b) should be withdrawn and the claims allowed at this time.

Claim 15 has been canceled. Accordingly, applicant respectfully submits that the rejection of Claim 15 under 35 U.S.C. § 102(b) should be withdrawn.

Claim 17 recites a method for digital interpolation of a digital input signal. Further, Claim 17 recites receiving a digital input signal with a predetermined clock frequency f_{in} . Claim 17 has been amended to recite providing a base function (BF) on the basis of a time-limited power sine function $h_1(t)$. Further, Claim 17 has been amended to recite calculating various sets of filter coefficients as a function on the base function (BF). Each of the various sets of filter coefficients comprises, in a useful signal frequency Δf_{nutz} of the digital input signal, an essentially equal amplitude response and different group delays τ . Claim 17 has also been amended to recite selecting a filter coefficient set whose group delay τ has a minimal deviation from a set desired group delay τ_{SOLL} . Further, Claim 17 has been amended to recite multiplying the digital input signal by the filter coefficients of the selected filter coefficient set. Claim 17 has also been amended to recite accumulating of the digital input signal weighted by the multiplication with the filter coefficients of the selected filter coefficient set.

Claim 17 includes features similar to Claim 1 that distinguish from Adams for the reasons set forth above. Therefore, applicant respectfully submits that Adams fails to disclose each and every feature recited by Claim 17. Accordingly, applicant respectfully submits that the rejection of Claim 17 under 35 U.S.C. § 102(b) should be withdrawn and the claim allowed at this time.

II.B. Rejections Based on Jiang

Jiang discloses a multi-rate digital filter for audio sample-rate conversion. Figure 3 of Jiang shows an interpolator **12**, which is connected in series to a low-pass digital filter. Further, Jiang discloses a filter structure **20** with the following four stages: (1) an expander / filter **22**; (2) an expander / filter **24**; (3) an expander / filter **26**; and (4) a decimator **28**.

Jiang fails to disclose each feature recited by element (a) of Claim 1. In particular, neither of the circuits shown in Figures 1 and 2 of Jiang include an interpolation filter with a filter coefficient generator as recited by element (a) of Claim 1. Further, Jiang does not disclose a base function BF generated on the basis of a time-limited power function $h_1(t)$ as recited by element (a) of Claim 1. The function H_3 as described in column 5, of Jiang, is described in the frequency domain and not the time domain. Accordingly, the Jiang circuit cannot employ a time-limited power sine function as recited by element (a) of Claim 1.

Further, Jiang discloses half-band FIR filters. These filters are only described by Jiang as including two polyphase filters, wherein each second sample is zero. Further, Jiang does not teach that various filter coefficients are generated by a filter generator wherein, in a useful frequency band of the digital input filter, each filter coefficient set has an essentially equal amplitude response but different group delays τ , as recited by element (a) of Claim 1. Applicant respectfully submits that Jiang does not disclose or suggest a filter coefficient generator that selects the filter coefficient set whose group delay τ has a minimal deviation from a set desired group delay.

Regarding elements (b) and (c) of Claim 1, applicant respectfully submits that Jiang does not disclose the element (b) feature of a multiplier or the element (c) feature of an accumulator.

In view of the foregoing, applicant respectfully submits that Jiang fails to disclose each and every feature recited by Claim 1. Accordingly, applicant respectfully submits that the rejection of Claim 1 under 35 U.S.C. § 102(e) should be withdrawn and the claim allowed at this time.

Claims 2, 5, 7, 9, and 10 depend upon Claim 1. Therefore, Claims 2, 5, 7, 9, and 10 include the features recited by Claim 1. Accordingly, for the reasons provided for Claim 1, applicant respectfully submits that the rejection of Claims 2, 5, 7, 9, and 10 under 35 U.S.C. § 102(e) should be withdrawn and the claims allowed at this time.

Claim 15 has been canceled. Accordingly, applicant respectfully submits that the rejection of Claim 15 under 35 U.S.C. § 102(e) should be withdrawn.

Claim 17 includes features similar to Claim 1 that distinguish from Jiang for the reasons set forth above. Therefore, applicant respectfully submits that Jiang fails to disclose each and every feature recited by Claim 17. Accordingly, applicant respectfully submits that the rejection of Claim 17 under 35 U.S.C. § 102(e) should be withdrawn and the claim allowed at this time.

III. Claim Rejections Under 35 U.S.C. § 112

Claims 1-16 and 18-25 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the claimed subject matter. The Examiner requires claim amendments to place the claims in accordance with U.S. practice. In particular, the Examiner states that apparatus claims are basically a combination of structurally interconnected elements and method claims are basically a sequence of actively performed steps. The claims have been amended in accordance with the Examiner's suggestions.

Regarding Claims 12 and 13, the Examiner states that the phrase "the base function" lacks antecedent basis. Claims 12 and 13 have been amended to delete the phrase "the base function". Further, applicant respectfully submits that the phrase has been properly introduced in amended Claim 1.

Regarding Claim 15, the Examiner states that the phrase "the weighted digital input signal" lacks antecedent basis. Claim 15 has been canceled. Further, the applicant respectfully submits that the phrase has been properly introduced in amended Claim 1.

Regarding Claim 23, the Examiner states that the phrase "the second fundamental function GF" lacks antecedent basis. Claim 23 has been canceled.

Accordingly, in view of the above claim amendments and remarks, applicant respectfully submits that the rejection of Claims 1-16 and 18-25 under 35 U.S.C. § 112, second paragraph, should be withdrawn.

IV. Specification

The Examiner notes that the references to the claims at pages 5 and 8, of the specification, are improper. The specification has been amended to remove the references to the claims at pages 5 and 8.

The Examiner requests that applicant corrects any errors which applicant may become aware of in the specification. Applicant has not discovered any other errors in the specification at this time.

V. Drawings

The Examiner contends that all of the elements in Figure 2 are not readily identifiable by the symbols used and are required to be labeled properly. Figure 2 has been amended to include labels for blocks 5, 15, 20, 23, 26, and 28. Applicant respectfully submits that the elements in amended Figure 2 are readily identifiable and labeled properly.

CONCLUSION

In light of the above Amendments and Remarks, it is respectfully submitted that the present application is now in proper condition for allowance, and an early notice to such effect is earnestly solicited.

If any small matter should remain outstanding after the Patent Examiner has had an opportunity to review the above Amendments and Remarks, the Patent Examiner is respectfully requested to telephone the undersigned patent attorney in order to resolve these matters and avoid the issuance of another Official Action.

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DEPOSIT ACCOUNT

The Commissioner is hereby authorized to charge any fees associated with the filing of this correspondence to Deposit Account No. 50-0426.

Respectfully submitted,

JENKINS, WILSON, TAYLOR & HUNT, P.A.

Date: December 19, 2006

By:

A handwritten signature in dark ink, appearing to read "Richard E. Jenkins", is written over a horizontal line.

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REJ/BJO/gwc

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